IETF 109, IPPM WG   draft-geib-ippm-connectivity-monitoring

Scope:

Monitor Segment Routed subpaths or links to detect and locate loss of connectivity and congestion.

Properties:

- Designed to monitor network sections with known topology.
- One measurement path per monitored link (or 0,5 per monitored interface).
- Change point detection doesn't require well synchronised timestamps.
- Applies segment routing to allow for an a priori designed network tomography evaluation and a limited number of monitoring systems.
- Round-Trip Delay and One-Way Delay estimate of the monitored link or path.
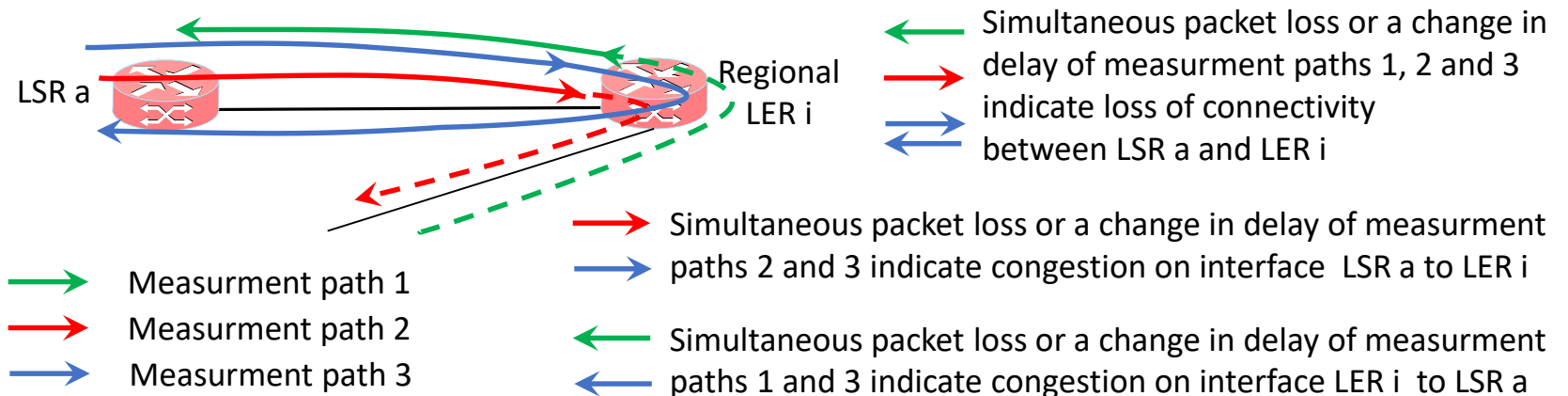
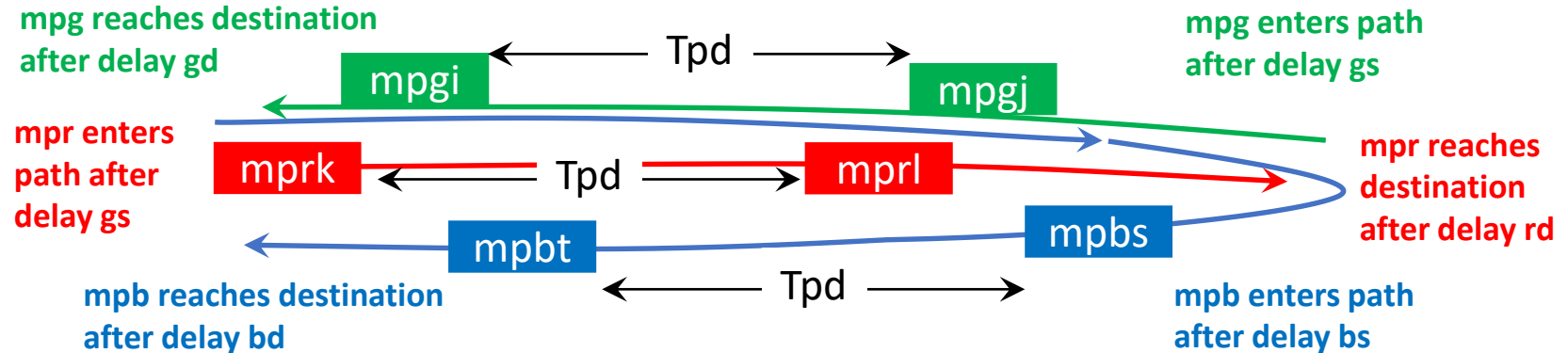Aim:

- Standardise suitable metrics.

Set-up of each individual measurement path (one only shown):
1 round trip, 1 downstream & 1 upstream pass of different monitored LSR – LER IFs.

LSR a

Path Monitoring
System

Regional
LER i

LSR b

Regional
LER j
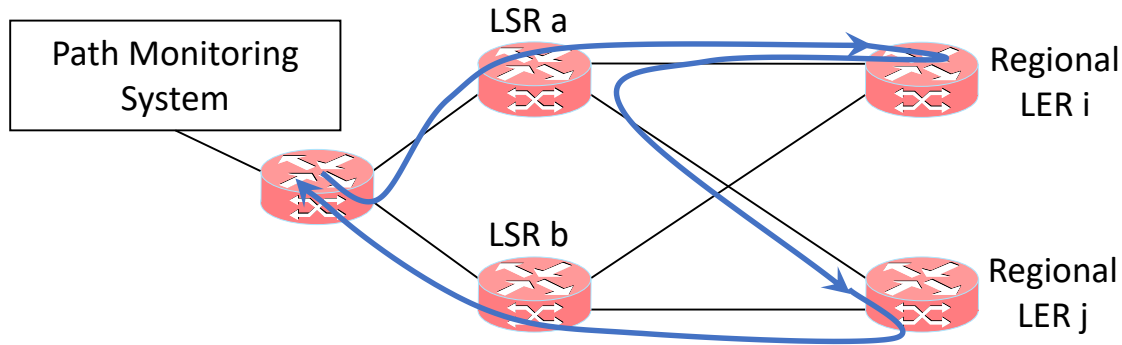
Detection of events (different measurement paths combine as shown below to create an individual measurement path combination per monitored interface):

LSR a

Regional
LER i

Simultaneous packet loss or a change in delay of measurment paths 1, 2 and 3 indicate loss of connectivity between LSR a and LER i

Simultaneous packet loss or a change in delay of measurment paths 2 and 3 indicate congestion on interface LSR a to LER i

Measurment path 1
Measurment path 2
Measurment path 3

Simultaneous packet loss or a change in delay of measurment paths 1 and 3 indicate congestion on interface LER i to LSR a

Temporal resolution of event detection

mpg reaches destination after delay gd

mpg enters path after delay gs

Tpd

mpgi

mpgj

mpr enters path after delay gs

mprk

Tpd

mprl

mpr reaches destination after delay rd

mpbt

mpbs

mpb reaches destination after delay bd

Tpd

mpb enters path after delay bs

All measurement packets mp of all pathes to be monitored are sent periodically by a distance of Tpd. An event of duration of 2*Tpd (or longer), impairs six different measurement packets and should be reliably detected.

Note that these packets may not have left the sender simultaneously, nor should they be expected to be received simultaneously, if Tpd is on an order smaller than the measurement path delay. They are simultaneously impaired on a monitored path.

If Tpd is on the order of seconds or bigger and per measurement path delays are on the order of milliseconds, then all impaired packets will be within the same send/receive interval.